of fuel pellets therein, and the at least one fuel assembly including at least one water rod arranged among the fuel rods, the method comprising the steps of:

providing a resistance member at a lower end portion of the at least one fuel assembly;

providing a coolant ascending path in the at least one water rod and a coolant inlet port for the coolant assembly ascending path which is open in a region lower than the resistance member; and

providing a coolant descending path in the at least one water rod which is communicated with the coolant ascending path, the at least one water rod having a coolant delivery port open in a region higher than the resistance member so as to guide the coolant downwardly in the coolant descending path in an opposite direction in which the coolant flows in the coolant ascending path.

39. A method according to claim 38, wherein the resistance member is provided as the fuel rod holding portion of the lower tie plate.

40. A method according to claim 38, further comprising the step of locating the coolant ascending path in the at least one water rod so as to extend beyond an upper end of a fuel pellet-filled region of the fuel rods of the at least one fuel assembly.

41. A method according to claim 38, further comprising the step of locating an upper end of the coolant ascending path in the at least one water rod at a position lower than an upper end of a fuel pellet-filled region of the fuel rods of the at least one fuel assembly.

42. A method according to claim 40, further comprising the step of locating the coolant delivery port of the at least one water rod at a position near a lower end of the fuel pellet-filled region.

43. A method according to claim 38, further comprising the step of locating the coolant descending path of the at least one water rod so as to surround the coolant ascending path of the at least one water rod.

44. A method according to claim 38, further comprising the step of regulating a flow rate of coolant supplied to the core including the steps of:

raising a coolant surface formed between the coolant and a vapor in the at least one water rod by increasing the flow rate of the coolant during at least one period from a beginning of one fuel cycle to an end of the one fuel cycle; and

further increasing the flow rate of the coolant supplied to the core during the at least one period in a state in which the at least one water rod is completely filled with the

coolant and no vapor is present in the at least one water rod at least at the end of the one fuel cycle.

45. A method according to claim 44, wherein the step of raising the coolant surface includes increasing the flow rate of the coolant in the range of 0% to less than 110% of the flow rate and the step of further increasing the flow rate of the coolant includes increasing the flow rate above 110% of the flow rate.

46. A method according to claim 38, further comprising the steps of loading a plurality of fuel assemblies in the reactor core, providing a plurality of water rods among the fuel assembly and controlling the amounts of voids accumulated in the water rods.

47. A method according to claim 46, wherein the resistance member is provided as the fuel rod holding portion of the lower tie plate.

48. A method according to 46, wherein the step of controlling the amount of voids include the step of regulating a flow rate of coolant supplied to the core including the steps of:

raising a coolant surface formed between the coolant and a vapor in the at least one water rod by increasing the flow rate of the coolant during at least one period from a